



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/813,328	03/30/2004	Masayuki Iijima	NIS-15441	5100
40854	7590	05/03/2006	EXAMINER	
RANKIN, HILL, PORTER & CLARK LLP 4080 ERIE STREET WILLOUGHBY, OH 44094-7836			PAPE, ZACHARY	
			ART UNIT	PAPER NUMBER
			2835	

DATE MAILED: 05/03/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/813,328

Applicant(s)

IIJIMA ET AL.

Examiner

Zachary M. Pape

Art Unit

2835

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3,4,6 and 7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,6 and 7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

The following detailed action is in response to the correspondence filed 2/10/2006.

The objection to claim 5 has been withdrawn in view of the cancellation of claim 5.

Claims 1, 3-4, and 6-7 stand rejected.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 4, and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Chien (US 6,166,907).

With respect to claim 1, Chien teaches an electronic component cooling apparatus comprising: a heat sink (1) having an electronic component mounting surface (Bottom of casing 12 as illustrated in Fig 1) on which an electronic component (3) to be cooled is mounted and a coolant path (123) with a coolant inlet (124) and a coolant outlet (124) through which a liquid flows as a coolant to forcibly cool the electronic component mounting surface; a radiator (6) having a liquid path (611) with a coolant inlet and a coolant outlet (Where 126 attaches with the radiator (6) accordingly as illustrated in Fig 4) through which the coolant flows and adapted to air-cool the liquid

Art Unit: 2835

path to cool the coolant, a motor-driven fan (62) mounted at a heat dissipating portion of the radiator to supply cooling air to the radiator (As illustrated in Fig 5) a first coolant path (126) connecting the coolant outlet of the heat sink to the coolant inlet of the radiator, a second coolant path (126) connecting the coolant outlet of the radiator to the coolant inlet of the heat sink; and a motor-driven pump (414) installed in the first coolant path or the second coolant path to give a moving energy to the coolant: wherein the motor-driven fan includes an air channel body (where the blades of the fan are located) having a suction port at one end thereof facing a front of the heat dissipating portion of the radiator and a discharge port at the other end thereof; an impeller having a plurality of blades (As illustrated in Fig 4), at least a part of the impeller being arranged inside the air channel body (As illustrated in Fig 4), said plurality of blades each have an edge facing the front of the heat dissipating portion, each of the edges sloping gradually away from the heat dissipating portion as each of the edges extends in a radially outward direction from a rotating center of the impeller (As illustrated in Fig 5); a motor (Column 3, Lines 20-21 implies that the fans (62) have a motor) for rotating the impeller so as to draw in air through the suction port and discharge air from the discharge port; and a plurality of engaging pieces (Screws as implied by the holes in each of the four corners of the fan body as illustrated in Fig 5) integrally provided at the air channel body; and wherein the radiator (6) has a plurality of engaged portions (61) with which the plurality of the engaging pieces engage (The screws of the air channel body screw into the engaging portion to attach the fan to the radiator as illustrated in Fig 5).

With respect to claim 4, Chien further teaches an electronic component cooling apparatus comprising: a heat sink (1) having an electronic component mounting surface (Bottom of 12) on which an electronic component (3) to be cooled is mounted and a coolant path (123) with a coolant inlet (124) and a coolant outlet (124) through which a liquid flows as a coolant to forcibly cool the electronic component mounting surface; a radiator (6) having a liquid path with a coolant inlet and a coolant outlet through which the coolant flows (Where 126 attaches with the radiator (6) accordingly as illustrated in Fig 4) and adapted to air-cool the liquid path to cool the coolant; a motor-driven fan (62) mounted at a heat dissipating portion of the radiator to supply cooling air to the radiator (As illustrated in Fig 4), a first coolant path (126) connecting the coolant outlet of the heat sink to the coolant inlet of the radiator; a second coolant path (126) connecting the coolant outlet of the radiator to the coolant inlet of the heat sink; and a motor-driven pump (414) installed in the first coolant path or the second coolant path to give a moving energy to the coolant: wherein the heat sink has a base plate (which 1221, 122 are part of) which has the electronic component mounting surface (Bottom part touching the electronic component) and a heat dissipating surface (1231), the heat dissipating surface being opposite to the electronic component mounting surface in a thickness direction of the base plate and in direct contact with the coolant (When the coolant is flowing through 123 it will directly contact 1231 as illustrated in Fig 2), the heat dissipating surface being so shaped as to have at least one pair of sides facing each other (As illustrated in Fig 2 each corrugation comprises two walls and a "crest" where the two walls face each other); wherein the heat sink (1) has the coolant inlet (124) and

Art Unit: 2835

the coolant outlet (124) so that the coolant can flow from one of the sides of the heat dissipating surface to the other side of the heat dissipating surface (Via 123); and wherein the base plate is so shaped in a transverse cross section as to form a resistance increasing portion (Column 3, Lines 4-5 where "corrugated" is illustrated as raised portions on the bottom surface (1231)) between the one side and the other side of the heat dissipating surface for increasing a resistance against a flow of the coolant (As illustrated in Fig 2), said resistance increasing portion being a raised portion that is formed by increasing a thickness of the base plate from the one side and the other side of the heat dissipating surface toward a center of the heat dissipating surface.

With respect to claim 6, Chien further teaches that the heat dissipating surface (1231) has a plurality of radiation fins (122) formed integrally therewith, and the plurality of radiation fins each extend in a first direction from the one side to the other side (From the end of 12 toward the inlet and outlet (124) or vice versa as illustrated in Fig 1) and are arranged along the heat dissipating surface at predetermined intervals in a second direction (From element 121 to opposite element 121 of 12 as illustrated in Fig 1) perpendicular to the first direction.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chien in view of Gwin et al. (US 6,749,012).

With respect to claim 3, Chien teaches the limitations of claim 1, but fails to teach a plurality of webs connecting a housing of the motor and an end portion of the air channel body on the side of the discharge pod are situated outside the discharge port or the end portion on the side of the discharge port is lower than an uppermost surface of the housing of the motor. Gwin et al. teaches a fan (14) containing a plurality of webs (14, wherein 14 is stated as the fan, but points to the web as illustrated in Fig 1) connecting a housing of a motor and an end portion of an air channel body on the side of a discharge port are situated outside a discharge port or an end portion on the side of the discharge port is lower than an uppermost surface of the housing of the motor. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the fan webs of Gwin et al. with the fan of Chien to provide further structural support for both the motor and the air channel body.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chien in view of Calaman et al. (US 6,578,626).

With respect to claim 7, Chien further teaches that the heat sink has a top plate (11) facing the base plate with a predetermined space therebetween and a peripheral wall portion (As best annotated as element 12 in Fig 1) connecting the base plate and the top plate, and positions of both end portions of the plurality of radiation fins (with respect to the first direction) are so determined that flow speeds of the coolant do not

Art Unit: 2835

very excessively greatly among flow passages (123) each formed between two adjacent radiation fins as the coolant flows in at the coolant inlet and flows out of the coolant outlet through the flow passages. Chien fails to teach that the coolant inlet and the coolant outlet are so formed near the one side and the other side respectively as to pierce through the top plate in a thickness direction thereof.

Calaman et al. teaches the conventionality of placing the flow inlet and outlet in a top plate (As illustrated in Fig 1) such that they are formed on a first and second side respectively. It would have been obvious to one of ordinary skill in the liquid flow art at the time the invention was made to combine the teachings of Calaman et al. with the cooling apparatus of Chien to place the incoming fluid in better communication with the radiation fins (The fluid will contact at least some of the top portion of the fin if introduced from above thus increasing the cooling efficiency of the heat sink).

Response to Arguments

3. Applicant's arguments filed 2/10/2006 have been fully considered but they are not persuasive:

With respect to the applicants' remarks to claim 1 that, "one skilled in the art would not interpret the Chien fan (i.e., fan 62 of Fig. 5) as teaching the impeller structure of amended claim 1", the examiner respectfully disagrees. As illustrated in the present office action Fig 1 below (An exploded view of fan 62), the fan blades have an edge facing the front of the heat dissipating portion. The examiner further submits that the blades must be sloping since the blades overlap (See edge of fan behind other blade,

Art Unit: 2835

the examiner notes that if the blades did not slope they would interfere with each other).

Finally the blades extend from a rotating center radially outward.

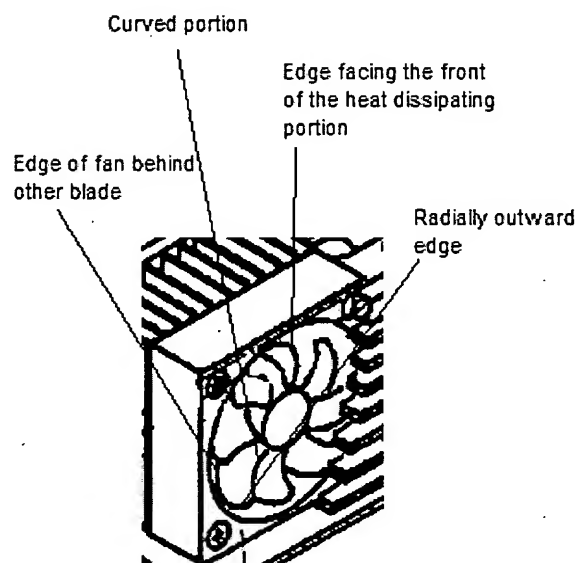
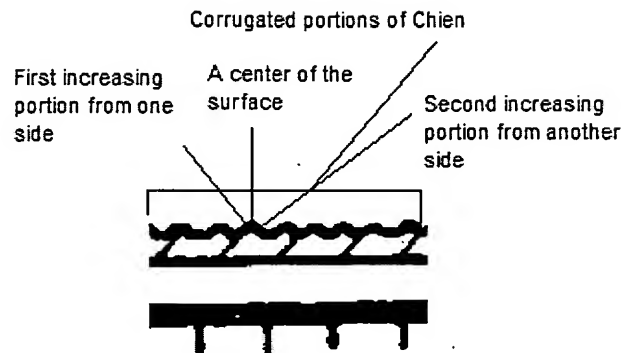


Fig 1

With respect to the applicants' remarks to claim 4 that, "the corrugated portion 1231 are not equivalent in structure (to the present invention)", the examiner respectfully disagrees. As illustrated in Fig 2 of Chien, the corrugations provide an increasing thickness of the base plate from the one side and the other side of the heat dissipating surface toward a center of the heat dissipating surface (See present office action Fig 2 below).

**Fig 2**

With respect to the applicants' remarks to claim 4 that, "the corrugated portions 1231 are not equivalent in function to the resistance increasing portion defined in amended claim 4", the examiner respectfully notes that claim 4 fails to require that the structure of the Chien reference perform the same function as the present invention.

With respect to the applicants' remarks to claim 3 that, "the webs illustrated in the Gwin patent are clearly disposed within the discharge port, rather than outside the discharge port as required", the examiner respectfully disagrees. As illustrated in the present office action Fig 3 below, that similar to the present invention, the structure of Gwin has a suction port and a discharge port. The examiner respectfully notes that the discharge port is directly adjacent the heat exchanger (36 - that is, the discharge port abuts against the heat exchanger) and thus the webs (Also denoted 14) are located outside of the discharge port as required in claim 3.

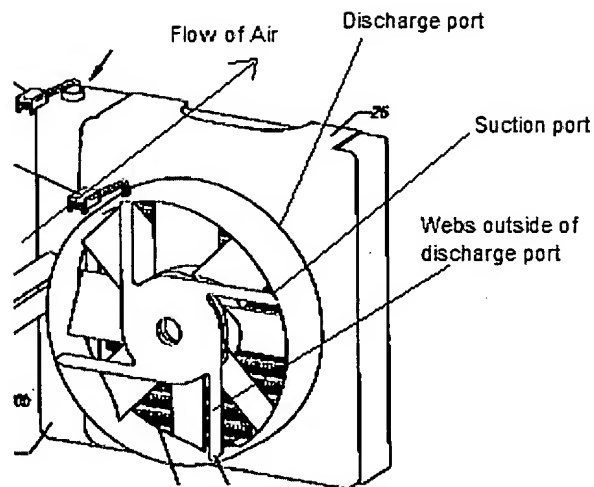


Fig 3

With respect to the applicants' remarks to claim 7 that, "Calaman does not teach any structure that is equivalent to the structure defined in claim 7. Notably, there is no mention in Calaman of positioning the end portion of the radiation fins so as to keep the flow speed of the coolant from varying excessively greatly among the flow passages", the examiner respectfully notes that Calaman at least teaches the structure of, "placing the flow inlet and outlet in a top plate such that they are formed on a first and second side respectively" (See Calaman, Fig 3). With respect to the Calaman reference failing to teach the positioning of the end portion of the radiation fins, the examiner respectfully notes that it was never the examiners position that the Calaman reference teaches the radiation fin positioning, only that Calaman teaches the flow inlet and outlet in a top plate.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 6,027,307 teaches curved fan blades.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zachary M. Pape whose telephone number is 571-272-2201. The examiner can normally be reached on Mon. - Thur. & every other Fri. (8:00am - 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynn Feild can be reached at 571-272-2092. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2835

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ZMP


LISA LEA-EDMONDS
PRIMARY EXAMINER